



### REMARKS

Claims 1-24 are pending in the application, each of which stands rejected under 35 U.S.C. § 112 and 35 U.S.C. § 103. In view of the foregoing amendments and the following remarks, applicant requests reconsideration of the rejection of the claims and reexamination of the application.

**Withdrawal of Rejection** Applicant appreciates the Examiner's withdrawal of the rejection under 35 U.S.C. § 103 over Schwertfeger et al in view of Smith.

**Information Disclosure Statement** Applicant notes the Examiner's comments in paragraph 2 on page 2 of the Office Action, that a number of the references listed on page 3 and 4 of the Information Disclosure Statement filed 17 August 2000 have not been considered, in the absence of a concise explanation of their relevance or an English language translation. The citations listed in the IDS were collected from a battery of patent applications dealing with aerogel type technology and commonly owned with the subject application. English language translations (in some cases being corresponding English language patent documents) are being submitted to the Examiner in a Supplemental Information Disclosure Statement.

Applicant appreciates the Examiner's efforts in entering the PCT publication numbers corresponding to the US serial numbers listed on pages five and six of the IDS. The US serial numbers were listed, in part, to afford the Examiner the opportunity to examine the files of pending applications commonly owned with the subject application and dealing generally with aerogel type technology.



**Abstract of the Disclosure** An abstract of the disclosure is provided by the foregoing amendments. As noted above, the abstract also is provided on a separate sheet of paper included as **Attachment A**.

**Specification** In accordance with the Examiner's suggestion in paragraph 4 on page 3 of the Office Action, the text and the question mark appearing in brackets on page 6, line 9 is deleted by the foregoing amendments. The undersigned believes that the bracketed text was included by the translator owing to some difficulty in reading the Examiner's copy of the original German language text. In fact, the translator was correct in rendering the text "RD 388,047" as it still appears on page 6, line 9 of the specification following the foregoing amendment. This can be seen from the original German text. A copy of that portion of the original German text is included as **Attachment C** to this paper, with the text "RD 388,047" highlighted in yellow for the convenience of the Examiner.

**Corrections** References to surface-silylating and surface-silylated in claims 11 and 13 are corrected for proper antecedent basis. A hyphen is added to correct the formula in claim 19.

**Claim Objections** Claims 19 and 21 are objected to for informalities identified in paragraph 5 on page 3 of the Office Action. The claim objections are respectfully traversed in view of the corrections presented in the amendments above. Specifically, the number "12" at the end of claim 19 is deleted and the spelling of "ketones" is corrected in claim 21, line 2. Accordingly, the objections to the claims are deemed to be overcome.

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**35 U.S.C. § 112** Claims 1-24 are rejected under 35 U.S.C. § 112, second paragraph. The Examiner finds claim 1 to be unclear in its description of the residues R. Applicant appreciates the Examiner's suggestion for clarifying claim 1 and overcoming the rejection. In the amendments above the definition of the residues R is reworded for improved clarity. In view of these amendments, the rejection under 35 U.S.C. § 112 is believed to be overcome and should be withdrawn.

**35 U.S.C. § 103** Claims 1-2, 9-12, 14-15, 17, 19 and 21-23 are rejected under 35 U.S.C. § 103(a) over Burns et al (US 5,750,610) or Lentz (US 3,122,520). Both Burns et al and Lentz are said by the Examiner to disclose a method of making organically modified lyogels with hydrophobic surface groups. For the reasons discussed below, the rejection is respectfully traversed.

The inventive subject matter of the claims is patentably distinguishable over the Burns et al patent. Also, the Burns et al patent is not properly cited as prior art against the present application. The effective filing date of Burns et al is 24 February 1997. The present application is entitled to a foreign priority date of 26 November 1996. Applicant has perfected their claim to priority under 35 U.S.C. § 119(a)-(b), since certified copies of the priority documents have been received by the US Patent Office from the International Bureau, as acknowledged by the Examiner in the first Office Action (Paper No. 5). The subject patent application is an English language translation of the priority PCT application. An English language translation of the priority German patent application DE 196 48 797.8 is being obtained and will be submitted. From the English language translation of the priority German patent application, the Examiner can establish that it satisfies the enablement and the description requirement of 35 U.S.C. § 112, first paragraph. Similarly, other citations mentioned by the Examiner, such as US patent

5,708,069 to Burns et al, which has an effective filing date of 24 February 1997 also cannot be relied upon by the Examiner as basis for rejection of the present claims.

Further, as noted above the Burns et al patent fails to teach or suggest the present invention. Burns et al does not teach or suggest a process for the preparation of organically modified aerogels, comprising introducing a lyogel into a reactor and washing the lyogel with an organic solvent.

Accordingly, the rejection over Burns et al should be withdrawn.

With respect to the Lentz patent, patentability of the subject claims is established by the failure of Lentz to teach or suggest the process defined by the present claims. While some of the materials of Lentz could be characterized as being aerogels or in the nature of aerogels, Lentz does not teach or suggest the present process. Lentz does not teach or suggest a process for the preparation of organically modified aerogels, comprising introducing a lyogel into a reactor, and washing the lyogel with an organic solvent, and surface-silylating the washed lyogel with a surface-silylating agent comprising disiloxane  $R_3Si-O-SiR_3$ .

The Examiner notes that the creation of an aerogel previously was cited only in the preamble of present claim 1. As amended above, step d) of amended claim 1 now expressly recites "drying the surface-silylated lyogel obtained in step c) **to obtain an aerogel.**"

Accordingly, the rejection over Lentz should be withdrawn.

Claim 13 is rejected under 35 U.S.C. § 103(a) over Burns et al. Burns et al is said by the Examiner to be cited for the reasons stated in connection with the previous rejection. In addition,

Burns is said to teach hexamethyldisiloxane. The rejection is respectfully traversed for the reasons noted above. Accordingly, applicant request that the rejection be withdrawn.

Claim 13 is rejected under 35 U.S.C. § 103(a) over Lentz. Lentz is said by the Examiner to be cited for the reasons stated in connection with the first rejection under 35 U.S.C. § 103(a), discussed above. The rejection is respectfully traversed for the reasons discussed above. Accordingly, the rejection is deemed to be overcome and should be withdrawn.

Claims 3-9, 16, 18, 20 and 24 are rejected under 35 U.S.C. § 103(a) over Burns et al or Lentz and further in view of Frank et al (US 5,866,027). Burns et al and Lentz are said by the Examiner to be applied in the same manner as above. The rejection is respectfully traversed. The Lentz and Burns et al patents each fails to support the rejection, either alone or in combination with Frank et al. Frank et al is directed to a process for producing xerogels and fails to cure the deficiencies of the Lentz patent and the Burns et al patent. Frank et al does not introduce a lyogel into a reactor and wash the lyogel with an organic solvent. Nor does Frank et al introduce a lyogel into a reactor, and wash the lyogel with an organic solvent, and surface-silylate the washed lyogel with silylating agent comprising disiloxane  $R_3Si-O-SiR_3$ .

Further to the reasons just discussed, dependent claims included in the subject rejection are patentable for various additional, independently sufficient reasons. Claim 4 is patentable for the additional reason that neither Lentz nor Burns et al, either alone or together with Frank et al, teach or suggest a process comprising the steps recited in claim 1, wherein step a) comprises introducing into the reactor a silicate-type hydrogel that is prepared by bringing an aqueous water glass solution to a pH value less than or equal to 3 with the aid of an acidic ion-exchanged resin or an inorganic acid and, via the addition of base, polycondensing the silicic acid to give a  $SiO_2$  gel. Accordingly, claim 4 is patentable for this additional reason.



For the reasons discussed above, applicant requests an indication of allowability of all claims pending in the application.

Respectfully submitted,

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Peter D. McDermott

4/18/01

Date



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ATTACHMENT A

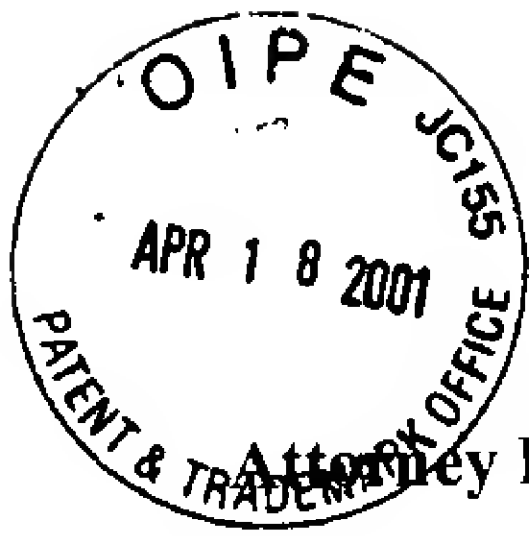
### Abstract of the Disclosure

A method for producing organically modified aerogels with permanently hydrophobic surface groups comprises the steps of providing a lyogel into a reactor, washing the lyogel in the reactor with an organic solvent, surface-silylating through the washed lyogel, and drain the surface-silylated lyogel. The surface-silylating agent comprises a disiloxane of the formula:



wherein the residues R, independently of one another, identically or differently, signifies in each case a hydrogen atom or a nonreactive organic that is linear, branched, cyclic, saturated or unsaturated, or aromatic or heteroaromatic residue.

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Attorney Reference: HOE96/F318US

ATTACHMENT B

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(3259.81131)

Applicant: Fritz Schwertfeger  
U.S.S.N: 09/308,770  
Filed: October 28, 1999  
Title: Method for Producing Organically Modified, Permanently Hydrophobic Aerogels

Paper No:

Group Art Unit: 1762

Examiner: Crockford, K.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

In the Specification:

The second paragraph on page 6 of the specification has been amended as follows:

For several years, organic aerogels have also been known. One finds in the literature, e.g. organic aerogels based on resorcinol/formaldehyde melamine/formaldehyde or resorcinol/furfural (R. W. Pekala, J. Mater. Sci. 1989, 24, 3221, US-A 5,508,341, RD 388,047 [368,047?], WO94/22943 and US-A-5,556,892). In addition, organic aerogels of polyisocyanates (WO95/03,358) and polyurethanes (US-5,484,818) are also known. One proceeds from initial materials such as formaldehyde and resorcinol dissolved in water, as described, for example, in US-A-5,508,341; these are brought to reaction with one another by suitable catalysts, the water in the pores of the gel that forms is exchanged for a suitable organic solvent, and then the gel is dried supercritically.

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In the Claims:

Claim 1 has been amended as follows:

Claim 1. (Twice Amended) A process for the preparation of organically modified aerogels with permanently hydrophobic surface groups, comprising:

- a. introducing a lyogel into a reactor;
- b. washing the lyogel introduced into the reactor in step a) with an organic solvent;
- c. surface-silylating the lyogel obtained in step b) with a surface-silylating agent to produce a surface-silylated lyogel and
- d. drying the surface-silylated [~~surface-silylating~~] lyogel obtained in step c) to obtain an aerogel,

wherein the surface-silylating agent in step c) comprises a disiloxane of formula I



wherein the residues R, independently of one another, identically or differently, signify in each case a hydrogen atom or a nonreactive[, ] organic residue that is [~~organic,~~] linear, branched, cyclic, saturated or unsaturated, or aromatic or heteroaromatic [~~residue~~].

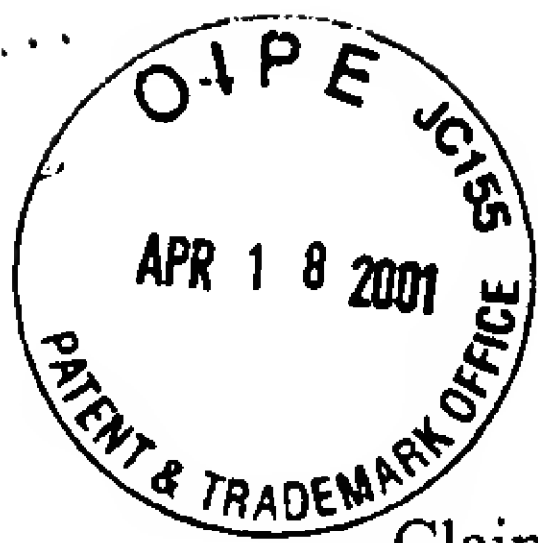
Claim 11 has been amended as follows:

Claim 11. (Twice Amended) A process in accordance with claim 1 wherein the surface-silylating agent in step c comprises symmetrical disiloxane.

Claim 13 has been amended as follows:

Claim 13. (Twice Amended) A process in accordance with claim 1 wherein the surface-silylating agent in step c) is hexamethylsiloxane.

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Claim 19 has been amended as follows:

Claim 19. (Twice Amended) A process in accordance with claim 1 wherein, prior to step c), the lyogel is washed with a solution of an orthosilicate capable of bringing about condensation, of formula  $R^1_{4-n}Si-(OR^2)_n$   $[R^1_{4-n}Si-(OR^2)_n]$  wherein  $n = 2$  through 4 and  $R^1$  and  $R^2$ , independently of one another, are hydrogen atoms, linear or branched  $C_1$ - $C_4$  alkyl residues, cyclohexyl residues or phenyl residues.[12]

Claim 21 has been amended as follows:

Claim 21. (Amended) A process in accordance with claim 10 wherein the organic solvent in step b) is selected from aliphatic alcohols, ethers, esters and ketones [keytones].

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